U.S.
S58s

December 1951

SOIL CONSERVATION

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE

SOIL CONSERVATION •

DECEMBER — 1951
VOL. XVII — NO. 5

CHARLES F. BRANNAN
SECRETARY OF AGRICULTURE

HUGH H. BENNETT
CHIEF, SOIL CONSERVATION SERVICE

ISSUED BY SOIL CONSERVATION SERVICE, U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

☆ THIS MONTH ☆

	Page
THE USE OF WATER IN HUMID AREAS By Hugh Bennett	99
W. F. HALL of GEORGIA—A Profile By Gordon Webb	104
BASIC TRAINING FOR YOUNG FARMERS By Robert W. Oertel	106
REPORT ON PROGRESS By Wellington Brink	107
EIGHT YEARS OF PROGRESS IN DAIRYING By Vernon W. Baker	109
THE RESPONSE OF PLANTS TO WATER By Paul B. Sears	113
HOW BANKERS MAY HELP By Louis P. Merrill	115
RAISING PRODUCTION ON AN ARIZONA FARM By William G. Williams	117
NOTES FROM THE DISTRICTS	119

WELLINGTON BRINK
Editor
Art Work by
W. HOWARD MARTIN

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business, under approval (August 6, 1951) of the Director of the Budget. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

15 CENTS PER COPY **$1.25 PER YEAR**
FOREIGN—$1.75 PER YEAR
25 percent discount on orders of 100 or more subscriptions mailed to a single address

BOOKLET BRINGS FRIENDS TOGETHER.—How farm-equipment dealers can bring greater prosperity to their communities is shown in a booklet, "The Farm Equipment Dealer and His Soil Conservation District," recently published by the Farm Equipment Institute.

Prepared under the direction of the institute's soil and water conservation committee, the two-color booklet describes why farm-equipment dealers should become aggressive workers for soil and water conservation.

"Our business of making and selling farm equipment," the booklet says, "is based primarily on the farmer operating a profitable business. If the productivity of the soil is eroded away by wind and water, or reduced by bad cropping practices, the farmer makes less profit. When the farmer follows modern conservation methods in his operations, he'll have greater profit and more permanent income. He will be in a better position to buy the farm equipment he needs. He will have more money to educate his children. He will be able to provide better medical care for his family, as well as better housing and farm buildings, and other items which help to raise the standard of living for the entire community."

(*Continued on page* 108)

FRONT COVER.—This strip cropping is part of the conservation farming on the farms of Albert Fox, Merill Pratt, and William Darlington, in Chester County, Pa. The photograph is by Hermann Postlethwaite.

All orders go to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

S. 8 558

THE USE OF WATER IN HUMID AREAS

By HUGH BENNETT

WATER has long been a controlling factor in the economy of the drier parts of the Western States; today it is rapidly assuming the importance it deserves in our more humid areas.

As industrial, urban, and agricultural expansion continues to accelerate in the East, water becomes a resource of increasing importance—a matter of critical significance with the rest of the country. Crops damaged by flooding in spring may be lost by drought in midsummer. Land needed for increased crop production may be so wet over a large part of the year that only by extensive drainage can it be brought into best production. Cities—even New York, the world's largest—at times may be complacent with overflowing reservoirs, only to find themselves rationing water a few months later.

In humid sections the need for management, conservation, and more efficient use of water in agriculture, as well as industry, has been recognized more slowly than in dry climates. Today, however, there is very little argument remaining as to the need for storing water in the soil, for capturing it for application to the land, or for disposing of it in an orderly manner.

"In all parts of the country . . . there is a growing recognition that we must conserve and develop, as well as use, our natural resources. And in conservation and development, as in use, water is the key resource.

"Now midway in the twentieth century, two facts have become compellingly clear.

"The first is that water is limited in relation to the many and varied needs for its use.

"The second . . . is that the management, conservation, and use of our water resource is inextricably bound up with the management, conservation, and use of our land and that both are essential to our expansion as a Nation."

In these words the President's Water Resources Policy Commission points up the need for sound management, conservation, and use of both soil and water without regard to geographic, climatic, or political boundaries.

Use of available water is of concern to both agricultural and nonagricultural interests. Both must share whatever supply there is; both must suffer whatever damage accrues from drought or flood or mishandling of the water resource.

A sound program for the conservation and orderly use of water in the humid portions of the United States must have as its purpose the physical control, protection, management, and use of this resource in such a way as to maintain crop and grazing lands and wildlife habitat for maximum

Deepened stream channel resulting from 15-acre drainage project supplies ample water for irrigation of this Ladino pasture on Bahler Farms, Inc., near Ellington, Conn., in the Tolland County Soil Conservation District. This farm placed first in the Connecticut Greener Pastures Contest.

952664—51

sustained benefits to people, agriculture, industry, commerce, and other segments of the Nation's economy. Such a program necessarily encompasses:

(1) Improvement of local supply, distribution, and use of water for irrigation and other agricultural purposes; provision for additional water; protection of existing supplies and of irrigation systems; and reduction in nonproductive use of water by certain types of vegetation.
(2) Development and protection of municipal and industrial water supplies, including reservoirs and wells.
(3) Drainage of wet fields, pastures, and other lands hazardous to agriculture; and protection of overflow areas—in order to bring about better use and protection of bottom lands and to increase and maintain soil productivity.
(4) Prevention of floods to reduce damage to life and property (by floodwater and sediment).
(5) Development and protection of recreational resources and fish and wildlife and their habitats.
(6) Conservation of runoff, otherwise wasted, through the use of farm ponds and diversion and spreading operations—for various farm and ranch purposes, such as fire protection and convenient access to water for spraying and livestock.

Even in humid areas where rainfall is generally considered adequate and in some instances excessive, there are from time to time crucial periods during which soil moisture is insufficient for optimum plant growth. This has been known since farming started along our eastern seaboard. Only recently, however, have we understood the full potentialities and economic feasibility of humid-area irrigation. Of course, crops like rice, cranberries, and water cress, which require ground saturation or actual inundation, have been irrigated for generations. At present, irrigation is being increasingly used for fruits; intensively grown, shallow-rooted crops, such as vegetables, berries, and flowers; and for high-producing pastures and other forage and field crops where temporary shortages of water sometimes critically depress yields. In the humid areas irrigation is steadily becoming a key factor in the conservation and use of land and water.

Preliminary 1950 census figures show that there were large increases in humid-area irrigation during the period 1944 to 1949. The largest acreage irrigated outside the rice-growing sections is in

This Florida orange grove is irrigated from a farm pond.

Florida, amounting in 1944 to 221,917 acres on 4,092 farms. This was principally for vegetable, citrus, and flower production. Other humid areas having substantial acreages irrigated in 1944 were in New Jersey, with 11,712 acres; Massachusetts, with 11,355 acres; New York, with 10,316 acres; and Pennsylvania, with 8,764 acres. These lands were irrigated chiefly for vegetables, cranberries, fruits, and flowers. There has been also a substantial amount of such irrigation in the eastern portions of the Carolinas and in Michigan and Wisconsin.

Approximately 1,600,000 acres of rice are irrigated in Louisiana, Arkansas, and eastern Texas. The extent of this operation places it in a somewhat different class from other types of humid-area irrigation. Many rice farmers in soil conservation districts, however, have adopted farm conservation plans which provide for improved water application, along with necessary drainage to get the water off at harvest time. Pasture-management practices also are involved with rice growing in this section.

Another large and important section relying on humid-area irrigation lies west of the Cascade Mountains, principally in Washington and Oregon. A large variety of crops is grown in this area under irrigation; included are improved pastures, truck crops, and special crops grown for seed.

Development of practical and efficient portable sprinkler systems has been a major stimulus to irrigation in humid areas. Such systems are well suited to irregular topography not normally irrigable by gravity methods. They are easily removed from fields to facilitate farming operations. They also fit into conservation farming by permitting proper crop rotations and contouring practices. Both dairying and beef production respond to pasture irrigation.

Increased economic returns from crop protection in recent years have encouraged the trend toward this type of irrigation. When farmers can sell their crops at good prices it pays to irrigate, as well as to follow other practices that assure any marked increase in yields. Severe and recurring droughts, one of the worst hazards of farming in humid areas, can be effectively dealt with by portable sprinkler irrigation.

Assistant Secretary of Agriculture Knox T. Hutchinson, at a meeting of the Darlington County, S. C., Agricultural Society, said recently that humid-area irrigation can "drought-proof" your farm up to a certain point.

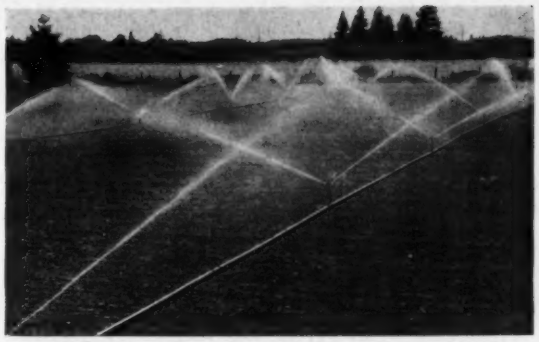
Increased income derived from one or two truck crops has sometimes more than paid for the cost of an irrigation system. The availability of irrigation water for truck crops permits a farmer to time his farming operations so as to have his crops ready to meet the most profitable markets. For example, he can irrigate a dry field and after a day or two plant young cabbage or other crops and quickly get a good stand—in timely adjustment with market prospects. Irrigation can thus be employed at will to meet the exigencies of drought.

Take peaches, for example. Here is a fruit that requires ample moisture at the right time, and timely irrigation will sometimes reduce unseasonable frost hazards to the peach crop.

Irrigation of pastures has been of growing importance. Farmers need green pastures during all the growing season. Conservation pasture practice not only calls for the most adaptable grasses and legumes and good all-round pasture management, including fertilizers, but for timely irrigation also. Some grasses, however, like bluegrasses, do not do well in hot weather, even where moisture is plentiful; they often get tough and less palatable.

In the Pacific Coast States. the Soil Conservation Service finds that around 600 pounds of beef are produced on good irrigated pastures as against gains that seldom exceed 250 pounds per acre on dry pastures. Dairy farmers have found that irrigated pastures enable cows to give more milk during summer dry spells. Many farmers in soil conservation districts have found that irrigation of pastures more than pays for itself.

Need for expert technical assistance becomes evident from the simple questions of the farmer who is considering irrigation. He may ask, for instance,



Sprinkler irrigation of new alfalfa seeding on the Keller and Price farm in the Clark-Skamania Soil Conservation District, Orchards, Wash.

"How often will I need to irrigate?" In New York State, it was found that under some conditions, several applications of irrigation water—sometimes a half dozen or more—may give good results.

Trained technicians are needed to help farmers with their irrigation problems, whether in high- or low-rainfall areas. Rainfall records are needed, of course, to determine the probabilities with respect to drought frequency. Also, optimum requirements of crops for moisture must be known. Moisture-holding capacity of soils has to be considered, also. The time, rate, and amount of water application are important factors, too.

The farmer must know the capabilities of his land and the availability of water on his own farm. How much water can he get from his streams, ponds, wells, or springs? In other words, he must know not only how much water he will need but how much he has. The Soil Conservation Service technician working with the local soil conservation district will tell him what kind of distribution system will be best for his farm.

Adequate technical assistance will include an inventory of the suitability of the land for irrigation. It is highly important to apply water when needed, in the amounts needed, and so as to avoid waste and prevent erosion. When all required information is at hand, the system must be carefully designed. And after a system is installed, it still must be operated properly.

The Soil Conservation Service is providing this kind of technical assistance, cooperatively through soil conservation districts, for thousands of farmers. Some of these technicians have spent their entire careers working in the field of irrigation.

They understand water and the land's need for water. They know the latest results of research, the best grasses for different parts of the country, how to prevent erosion, and other techniques of modern soil and water conservation.

An increasing number of commercial firms handling sprinkler equipment are doing a good job of designing improved mechanical features. Such designing covers adaptation of pumps and engines to different conditions, sizes of pipes, pipe fixtures, and sprinkler heads.

Humid-area irrigation has become an integral part of the program of many soil conservation districts throughout the United States. The humid area is generally considered as that land east of approximately the ninety-seventh meridian and on the Pacific Coast west of the Cascade Mountains. In this area land preparation for irrigation improvements increased from a very small start about 1946 to 110,047 acres in the fiscal year 1951 and the total land thus improved to June 30, 1951, amounts to 257,263 acres.

An example of irrigation under humid conditions is the South Tillamook Soil Conservation District in Oregon. After the district was established in 1940, one of the first actions of the supervisors was to initiate a program of improved irrigated pastures. The first step was to improve drainage. Tide gates previously constructed had to be lowered and rebuilt. New drains were dug in places, and dikes were repaired. With the assistance of Soil Conservation Service technicians, 200 of the 261 farmers in the district went ahead with their conservation program.

Because dairying is the chief agricultural enterprise in this district, conservation farming covers pasture improvement. Sprinkler irrigation and proper management of pastures largely account for the good record of the district's program. Establishment of adaptable, high-yielding pasture grasses and legumes was an early and important part of the work. Native pastures were plowed, cleared of brush and trees, leveled, and planted to temporary pastures. This permitted time for rotting out of the cumbersome tussocks and preparation of a better seedbed for long-time pastures. Irrigated pastures were seeded to tall fescue and Ladino clover.

In the South Tillamook district the annual rainfall exceeds 90 inches. Why irrigate with such a high rainfall, one might ask. The answer would be: The long summer dry seasons, lasting from late June to early September. Irrigation is needed during this period for the lush forage called for in high milk production.

Portable sprinkler system irrigating cucumbers on Thornhill farm, in Charleston County, S. C. Two or three additional pickings are made possible.

Thirty-eight percent of all farmers in the district use sprinkler irrigation; outside the district only 11 percent of the dairy farms are so equipped. Based on creamery records, district farmers produced 14.7 percent more butterfat on an average during 1942 to 1948 than was delivered in 1941. On the other hand, farmers outside the district produced 10.5 percent less during 1942 to 1948 than in 1941.

Water management has played an important part in the Charleston County, Georgetown, and Williamsburg Soil Conservation Districts in South Carolina. In this area the land is prevailingly flat and often nearly level. Rainfall is higher and drainage is a first essential to good agriculture. After the land is drained, many farmers provide water-control and overhead irrigation to assure ample moisture during drought periods. On a considerable number of vegetable farms, ground excavations have been made to save drainage water taken off the land following rainy spells, which is pumped back on the same land as irrigation water.

On the Copohee farm near Mount Pleasant a sprinkler irrigation system is used. Here a half to three-fourths of an inch of water applied at precisely the right time has sometimes meant the difference between crop failure and a good vegetable crop, sometimes grossing more that $1,000 an acre. Included in the Copohee system are two

reservoirs of a million gallons each. These supply water for the sprinkler system. They are filled from drainage ditches and runoff. Such storage and use of fresh water were resorted to only after water from deep wells of the locality was found to contain too much salt.

On Yonges Island, S. C., good results have been obtained from both gravity irrigation and portable sprinklers. Reservoirs and shallow wells supply the water for the farm of C. C. Garrity, a cooperator with the Charleston County Soil Conservation District. Depressions fingering up from the sea in this area have been converted into storage reservoirs to good advantage.

A striking method of managing water is seen on the Greenfield Plantation, not far from Georgetown, S. C. Here it has been found that an inch or two of water at the right time can save a crop. Underlying the topsoil and a sublayer of clay is a deep layer of sand. Subirrigation is obtained through this sand layer by lateral dispersion from the ditch. To control the water level, 7 miles of main canal, laterals, and farm ditches were dug. These provide drainage when there is too much water and subirrigation when there is too little. The subirrigation is accompanied by a system of gates installed in the ditches to raise the water to the necessary level for forcing it out through the sand layer during droughts.

On the west coast and in other parts of Florida this same principle of subirrigation is frequently employed in vegetable production.

Soil Conservation Service experience shows that good results with humid-area irrigation are generally derived from vegetables, fruits, pasture, and specialty crops where otherwise, moisture deficiencies cause frequent losses—in those places water can be obtained at reasonable cost.

Results with irrigation in high-rainfall areas have not all been uniform. Failures have sometimes resulted from excessive wet weather, deficiencies in plant nutrients, weeds, insects, and plant diseases. Considerable research is still needed to develop most effective methods of irrigation under humid conditions.

The effects of humid-area irrigation may prove important even for growing corn. Our technicians, working in cooperation with the Alabama Agricultural Experiment Station at Auburn, report that in 1950 a sprinkler-irrigation plot produced 101 bushels of corn per acre, as compared with 49

Irrigation equipment—pond, pump, and pipes—on the Burton Froberg farm in Washington County, R. I., cost $3,000. Maximum water use in 1950 was 250,000 gallons per day. That year increased hay production resulting from irrigation amounted to 25 percent, or 1 ton per acre. An even more spectacular performance was on schedule for 1951.

bushels per acre on a similar nonirrigated plot. Nine inches of water were applied to the irrigated plot, in addition to the 13.7 inches of natural rainfall during the 1950 crop season. A hybrid corn, thinned to 20,000 plants per acre, was used. At the time of planting, 800 pounds of 0-14-10 fertilizer were applied. On June 1, anhydrous ammonia was applied at the rate of 120 pounds of nitrogen per acre, followed by an application of nitrate of soda on June 15 at the rate of 120 pounds of nitrogen per acre. Irrigated and check plots received the same preparation, fertilization, and cultivation. If such yields of corn can be made consistently on suitable lands in the South, irrigation will have an even more important place in the agriculture of the region.

As agricultural problems are solved through research, field trials, and operational experience, it is likely that humid-area irrigation will require the development of new and better methods and many additional surface- and ground-water supply sources or installations. The availability of adequate water, in addition to the many needs for water other than for irrigation, is one of the most pressing problems for further study. Widespread increase in the use of water for irrigation may make it necessary to consider possible changes in State laws governing water use.

Irrigation in humid areas is now a part of the responsibility of the Soil Conservation Service. It is a growing and integral part of full soil and water conservation. It offers an opportunity to add to our Nation's crop production, to provide better control of erosion and runoff, and to round out our national program of soil and water conservation, to the benefit of all.

DISTRICT PROFILE

W. F. HALL of GEORGIA

FRIENDS say that W. F. Hall, of Sparta, Ga., is more interested in helping his fellow man than he is in helping himself.

If you look only at the record of this lumberman-farmer in soil conservation district activities, you'll see ample reason for such a statement. But Hall also is a leader in church, civic-club, and Boy Scout work, in boys' and girls' club activities, and in veterans' and fraternal organizations.

It would be impossible to learn all the contributions in time and money that Hall has made, and is making, to better living, to greater opportunities for youth, and to improved church institutions. When he is asked for his help with a project he considers to be for the welfare of his community, Hall's reply almost invariably is: "I'll do it if you won't tell anybody about it."

To the dismay of his closest friends, the Georgian refuses to let either his business or his health interfere with his soil conservation work in his own Piedmont Soil Conservation District, in the State, the Southeast, and the Nation.

When soil conservation district work began to keep him away from his W. F. Hall Lumber Co., he called his keymen together. He told them something like this:

"Soil conservation is more important to our people than anything else. If we take care of the land, all of us will live better. We will have better churches and schools and roads. Our rising generation and all future generations will have opportunities that you and I did not have. Further, we must be good stewards of the land and water resources that God gave to us. I have been given an opportunity, through districts, to help save and improve the land. If you run this business well, while I'm away, you will be making it possible for me to help with soil conservation, and that will be your contribution to this cause."

Hall laughingly says his planing mill and sawmills do better while he's away than when he's in the office or the woods.

But sometimes problems arise that his men think Hall alone can solve. That happened while he

Hall and registered Polled Herefords.

was in Memphis, Tenn., last February to attend a Department of Agriculture meeting on the Secretary's order No. 1278 coordinating the Department's soil and water conservation work.

Told by telephone in Memphis of a difficulty at the planing mill, Hall replied: "This meeting is terribly important. Just shut down the mill until I get home." But when he returned to Sparta, he found the planing mill running, the problem already solved.

Hall became a supervisor of the Piedmont Soil Conservation District when his friend, Private Banker Marvin Pound, resigned from the district board in 1947. Pound urged Hall's appointment, because he knew Hall was a soil conservationist at heart. The lumberman already was carrying out a good soil and water conservation program on his own land as a district cooperator.

Soon Hall was active in the State Association of Soil Conservation District Supervisors. In 1948 he was named association president. The following February he organized and led the South's

largest delegation of supervisors to the annual meeting of the National Association of Soil Conservation Districts in Denver. While much of the Midwest was blanketed by snow and ice from severe winter storms, the Georgians talked green pastures and green fields in their home State and in the Deep South. Atlanta's invitation for the 1950 National Association convention was accepted.

If you were in Atlanta in February 1950, you know how well the Georgia supervisors and their friends in Atlanta, Macon, Perry, Fort Valley, Mansfield, and Thomaston prepared for what proved to be the National Association's biggest convention up to then. Three times as many delegates went to Atlanta as to any preceding convention. And the story of the South's soil and water conservation work, its winter grazing, and its green cover crops was spread over the Nation, as Hall knew it would be.

At the Atlanta convention, the Sparta lumberman-farmer was elected Southeastern vice president of the National Association—a busy, payless job which he still holds. Believing that all people will help the districts if given an opportunity, Hall has taken the leadership in the Southeast in getting the National Association's Program for Greater Service started. He discussed this program at annual meetings of State associations in Florida, Georgia, Mississippi, South Carolina, North Carolina, and Virginia last fall and winter. A meeting of the National Association's executive committee kept him from going to the Alabama convention, and icy weather prevented his attending the Tennessee session.

When Hall is away on district affairs, he knows that his farm, as well as his lumber business, is in good hands. His brother-in-law, J. C. Clarke, and he are partners in the operation of the 2,850-acre farm they call Hamburg.

A whole-farm soil and water conservation program is nearly completed on Hamburg's hills and valleys. W. N. (Red) Watt, SCS technician, helped develop the plan. More than 1,800 acres are in protected and managed woodland.

"We haven't had a fire in the woods in the nearly 5 years that I've been here," Clarke said.

Of the 850 acres of open land, 450 are in cotton, small grain, annual lespedeza, corn, velvet beans, and blue lupine, grown in a conservation farming system. Open land not suited for cultivation grows pasture for a commercial herd of Herefords led by registered bulls.

Hall was a pioneer in his district in the planting of tall fescue and Ladino clover for permanent pastures. He planted 40 acres in 1945 when a 5-acre patch was considered unusual in most parts of Georgia.

Hamburg also has a 214-acre lake on Little Ogeechee River. Hall finds relaxation on the lake and in the stream, where he takes bass (locally called trout), redbreast, warmouth, and jack with his fly rod. In the bobwhite quail season you frequently can find the lumberman-farmer and his bird dog Rex hunting in the wildlife field borders and bicolor lespedeza seed patches.

Hall's "home farm," nearer Sparta than Hamburg, is entirely in permanent pasture—all 112 acres of it except the home site and a 2-acre fish pond. On Ladino clover, fescue, sericea, crimson clover, Bermuda-grass, annual lespedeza, and kudzu he has a herd of registered Polled Herefords. Hall's 14-year-old daughter Sylvia, a 4-H Club member, has a cow and calf.

Recognition, as well as hard work, has gone to W. F. Hall as a result of his wide interest in community affairs. He was awarded the Silver Beaver, highest honor given by the Boy Scouts of America. He represents the Central Georgia Council in the National Boy Scout Council. Once Hall was chosen a master farmer by the American Legion. He is a member of the advisory council of the United States Forest Service in Georgia. He teaches a Sunday School class in the Baptist Church. He is a member of the Georgia State Soil Conservation Committee, composed entirely of district supervisors. He is chairman of the Hancock board of county commissioners.

Each year he gives a prize to the club boy growing the most corn on an acre. The prize is $1 a bushel, and one year he paid the winner $115 in a county where the corn yield averages only 14 bushels per acre.

Hall has served as president of the Lions Club, commander of the American Legion post, district Legion commander, and master of his Masonic lodge.

But he is best known in the State, the Southeast, and the Nation as a soil conservation farmer and district supervisor.

—Gordon Webb

BASIC TRAINING for YOUNG FARMERS

By ROBERT W. OERTEL

INTEREST in land capabilities has been whetted among vo-ag students in the Macon County (Ill.) Soil Conservation District as a result of a recent land-capability judging contest.

This contest was sponsored as part of the district's Program for Greater Service.

The purpose was twofold: (1) To acquaint FFA and the public with the concept of land capabilities and (2) to provide a teaching medium for instructors of vocational agriculture.

Note.—The author is district conservationist, Soil Conservation Service, Decatur, Ill.

Ervin Runion, of Warrensburg, Ill., sights through ordinary hand level to determine slope. His companion is Bob Drake, of Niantic, Ill.

Robert Skinner, Argenta, Ill., measures depth of topsoil while Leland Ruch, Maroa, Ill., records his observations.

John Mangis, work unit conservationist, holds land-capability map while the author explains official version.

Teams of six FFA boys from each of the seven different high schools in Macon County participated. Contestants were scored on their ability to rate various factors shown on a land-capability map furnished by the Soil Conservation Service.

In addition to rating physical land characteristics, contestants were required to make the land-capability classification, select the best land use, and determine a suitable crop rotation and the conservation practice necessary for each of six locations on the contest field. Slope and practice limitation charts were used to determine the most intensive cropping systems suitable for different soil, slope, and erosion-control practices.

Details of the score card were determined by a committee consisting of Melvin Nicols, vo-ag instructor; Warren Myers, farm adviser; Frank Purnell, extension conservationist; and Robert W. Oertel, district conservationist.

After the score cards were graded, the district conservationist accompanied each vo-ag instructor and his class on a field trip to demonstrate land capabilities. Nearby farms of district cooperators were visited because land-capability maps were available for use. These field studies made it possible for teachers and students to gain a better working knowledge of the subject.

The real value of the contest is well summed up in the words of Mel Nicols, vo-ag instructor at Maroa High School: "The time spent in preparation for the contest is the time of real benefit. All my students gained a real appreciation of land capabilities on their own farms. The contest itself was primarily a test of their training."

All of the vo-ag instructors were enthusiastic over results.

REPORT ON PROGRESS

By WELLINGTON BRINK

TWO hundred fifty years after Antoine de la Mothe Cadillac set foot on the site of what was to become Fort Pontchartrain, and later Detroit, a group of modern adventurers called Friends of the Land assembled high up in a city hotel for the purpose of taking another look at our much-abused but still incredibly rich countryside.

Where lay in 1701 the swamps and creeks and rivers, the untouched woodlands and prairies and pine-fringed beaches, now rise the brick and steel forests of teeming industry. The freighters of the Great Lakes and the sleek wagons-on-wheels have taken the domain from the Red Man—but the conquest of soil and timber and water continues to this very day.

The early explorers might find it difficult to recognize the trails they blazed for God and France. But they did blaze trails, and they did open up the land that now supports the Twentieth Century, and provides the highest standards of life and living ever known to this planet Earth.

The victory has not been without cost. From one rugged edge of the Continent to the other, the Age of Discovery was followed by the Age of Exploitation. By fire and plow, by ignorance and avarice, the natural treasure was looted and the early beauties were despoiled. Generation after generation took their toll, and the country felt the losses of its basic resources.

Then came the quickening of conscience, the national awakening. Uncle Sam's brow furrowed with worry as the gullies deepened and the effects of the erosional process became increasingly apparent. A reversal of heart and mind and activity ensued, and a slow, arduous national soil conservation movement got under way aimed at restoration, rehabilitation, and permanent usage of the land according to its capabilities.

It has been something like two decades now since the American people first bestirred themselves. Farmers, scientists, technicians, and almost every segment of the public have found ways to join in the concerted effort to safeguard the American soil and put it to its highest permanent productivity.

Signposts everywhere tell us that progress has been made. Farming on contour is an everyday sight. Increased yields, enhanced farm incomes, added tax returns, proclaim a rural prosperity beyond anything previously enjoyed. Schools, churches, libraries, highways, all reflect the better times that have come from soil and water conservation. And yet, the biggest part of the job is still ahead.

It was to see just where the Nation stands with regard to its natural resources—to take inventory, to appraise and evaluate—that Friends of the Land met in Detroit in September. The important aspect of this initial day of accounting is the fact that it opened up an important new series of annual events as unique in its department as the series of institutes on conservation, nutrition, and health, which is sponsored by the same organization. As the lay scorekeeper, the coordinator for the public, Friends of the Land has found another useful role for service.

Jonathan Forman, veteran vice president, presided at the daytime sessions, September 25, and stated the aims of the conference. Hugh Bennett, Chief of the Soil Conservation Service, with chart and map traced the progress of soil conservation—progress which shows the conservation job completed, up to the stage of maintenance and improvement, on 21.4 percent of the Nation's farm land needing protection and not including the "spread" of practices on many individual farms for which records are not available. Bennett also noted that some soil conservation districts already are planning to celebrate soon the 100-percent completion of their basic programs; that 16 districts have finished more than 80 percent of their work up to the stage of maintenance and improvement; that approximately 150 districts have completed 50 to 97 percent, and that approximately 300 have finished 25 to 50 percent.

Other speakers included D. Howard Doane, of Agricultural Service, Inc.; Arthur Hawthorne Carhart, author of "Water—Or Your Life"; Samuel T. Dana, professor of Forestry, Filibert Roth University; Russell Coleman, president of the National Fertilizer Association; and Clyde Williams, director of Battelle Memorial Institute.

Paul B. Sears, head of the Department of Conservation, Yale University, at a dinner meeting summarized the conference discussions. Highlight of the occasion was the presentation of the highest award of Friends of the Land—the Hugh Hammond Bennett gold medal for outstanding contribution to conservation. The recipient this year, the second year offered, was Louis Bromfield, Lucas, Ohio, vice president of the society and famed for his novels and also his writings on Malabar Farm. The presentation was made by Bennett himself, who declared that Bromfield "has blended the dramatic information acquired on his own acres with the outpourings of his own heart and soul. As a result, he has reached millions of men and women who had never been reached before, and greatly shortened the time that will be required to get the soil conservation job done."

BOOKLET BRINGS FRIENDS TOGETHER

(*Continued from page* 98)

Front cover of new booklet.

The booklet outlines in considerable detail what the farm-equipment dealer can do to cooperate with the local soil conservation district.

Most farm-equipment manufacturers are obtaining copies of the booklet for their dealers. The Farm Equipment Institute also is making copies available to district supervisors.

Waters S. Davis, Jr., president of the National Association of Soil Conservation Districts, announced: "The Association plans to give complete support to farm-equipment dealers in this conservation effort.

"I am sure that soil conservation district officials will welcome the valuable assistance of dealers as members of the local advisory committees through which each district carries out its Program for Greater Service. It's a good alliance. The FEI is to be congratulated on the leadership it has taken."

This improved pasture is a typical result of conservation farming in the South Tillamook Soil Conservation District.

EIGHT YEARS OF PROGRESS IN DAIRYING

By VERNON W. BAKER

IRRIGATION where the average annual rainfall is over 90 inches? Incredible, you say? It is not incredible at all to farmers in western Oregon's noted Tillamook cheese-producing area. Here it has proved an important factor in the program of the South Tillamook Soil Conservation District calling for better use of its land resources. This program has resulted in boosting butterfat production nearly 15 percent over the period from 1941 to 1948.

While this increase was taking place inside the district, butterfat production in the remainder of Tillamook County which was without benefit of a conservation program declined about 10 percent. Significantly, 38 percent of all the dairy farms in the district had sprinkler irrigation systems. Outside the district only 11 percent of the dairy farms had sprinkler systems.

But why irrigation in an area receiving nearly 8 feet of rain annually? The answer lies in the fact that, despite this seemingly excessive amount of moisture, normally only a very small part of the rain falls during late June, July, August, and early September. Nature, therefore, requires assistance to maintain a lush pasture growth over the long growing season in an area devoted almost entirely to dairying.

Dairy products make up more than 83 percent of the total value of all farm output here in Tillamook County. They are marketed cooperatively through the Tillamook County Creamery Association. This parent organization until 1949 was made up of 16 local community associations, each with a cheese factory and plant which served as the milk-receiving station for the farms in the vicinity.[1] By means of these local cheese factories, it is easy to compare the production from farms within the South Tillamook Soil Conservation District with that from farms in the rest of the county. This comparison is summarized in table 1, following.

Note.—The author is an economist and soil conservationist with the Soil Conservation Service, Portland, Oreg. This article is based on a leaflet prepared by Mr. Baker, "Community Gains from Conservation Farming."

[1] The Tillamook County Creamery Association opened a new modern central plant late in 1949.

TABLE 1.—*Comparison of butterfat production from farms within the soil conservation district and from farms in the rest of Tillamook County, 1940-48*[1]

Year	Butterfat production within the district				Butterfat production in rest of Tillamook County			
	Butterfat delivered to factories	Part of county total	Increase over 1941 production		Butterfat delivered to factories	Part of county total	Decrease from 1941 production	
	Pounds	*Percent*	*Pounds*	*Percent*	*Pounds*	*Percent*	*Pounds*	*Percent*
1940	1,186,226	32.0	----------	----	2,518,733	68.0	----------	----
1941	1,363,743	31.8	----------	----	2,929,895	68.2	----------	----
1942	1,439,296	33.5	75,553	5.5	2,851,332	66.5	78,563	2.7
1943	1,424,199	35.8	60,456	4.4	2,552,650	64.2	377,245	12.9
1944	1,558,742	37.4	194,999	14.3	2,606,431	62.6	323,464	11.0
1945	1,627,843	37.8	264,100	19.4	2,678,071	62.2	251,824	8.6
1946	1,595,127	39.8	231,384	17.0	2,411,342	60.2	518,553	17.7
1947	1,669,194	38.4	305,451	22.4	2,673,736	61.6	256,159	8.7
1948	1,632,786	38.8	269,043	19.7	2,577,639	61.2	352,256	12.0
Total	13,497,156	36.2	1,400,986	14.7	23,799,829	63.8	2,158,064	10.5

[1] Data taken from records of the Tillamook County Creamery Association.

The soil conservation district includes only about 32 percent of the dairy farms and about 27 percent of the county's agricultural land.

The seeming paradox of sprinkler irrigation along one of the wettest parts of Oregon's rain-drenched coast is only part of the story of what soil conservation has meant to district dairymen. While important in the production gains of the last decade, it nevertheless had to wait the development of numerous other features of the district's conservation program. Let's go back to the beginning.

Early in 1940 the farmers in the lower Nestucca Valley and the Sand Lake areas of Tillamook County voted to organize the South Tillamook Soil Conservation District to do something about their land problems. Not only did they lack sufficient moisture during the summer months but they had far too much during other seasons.

For years they had been troubled with poor drainage of wet lands along the narrow coastal

Improved, irrigated pastures are the primary reason for the steady gains in butterfat production in the South Tillamook Soil Conservation District.

valley bottoms and tide flats, despite the existence of three different drainage districts dating back to 1919 and 1920. Poor drainage meant low-producing native grasses, tussocks, and other vegetation which could tolerate these wet conditions.

The five district supervisors were quick to take action towards solving this problem. One of their first tasks was to improve the major drainage facilities. The tide gates of the old drainage districts were lowered and improved. Main outlet ditches were cleaned out or reconstructed. New drainage ditches were dug, and dikes repaired. These major improvements made possible the more effective planning and development of drainage and other conservation needs on the individual farms. With the main ditches and outlets in condition to cope with the excess water, individual farmers were encouraged to proceed with the district's program on their lands.

Some 200 of the 261 farmers in the district entered into agreements with the district to carry out soil and water conservation plans on their farms. Since dairying is the chief agricultural enterprise, the primary use of the agricultural land is for pasture. A program of conservation farming consequently is largely one of pasture production.

Establishment of adapted, high-yielding pasture grasses was one of the first objectives. As rapidly as the drainage problems were improved on the bottom lands, native pastures were plowed up, cleared of any trees and brush, leveled, and seeded to temporary pastures of ryegrass, red clover, and alsike clover. This permitted time for rotting of tussocks and the preparation of a better seedbed for improved, long-lived pastures. Permanent pasture seedings varied with irrigation and soil drainage of bottom lands and hill lands. Irrigated pastures were seeded to Alta fescue and Ladino clover. Meadow foxtail or Alta fescue and big trefoil were used on the wetter bottom lands. Alta fescue, orchardgrass, white clover, and English ryegrass were used on the well-drained bottom lands. Nonirrigated hill lands were seeded to Alta fescue, orchardgrass, English rye, creeping red fescue, and subterranean clover.

Sprinkler irrigation and management of these pastures became the most important factors in the high forage yields obtained after the establishment of the improved grasses. A fertilizer program was instituted. Rotation grazing, occasional clipping of the older growth, and scattering of droppings

A dragline digging a drainage ditch through an unimproved pasture. Poor drainage is indicated by heavy growth of tussocks just beyond the machine and by the scattered clumps in the foreground.

helped to improve yields. Needless to say, these improved pastures hold an important advantage over lower-producing pastures in paying the costs of a sprinkler system and other management practices.

Silos are being used more and more to utilize the excess forage growth in the spring when Nature's impetus to the growth rate is greatest. Attempts to make hay at this time of year usually result in spoilage because of weather conditions. Grass silage provides a succulent dairy feed during the winter months and cuts down on the amount of hay needed in the ration.

Fourteen percent of the dairy farms in the district had one or more silos in use by the end of 1948. Most of them had been built since 1945. By contrast, only 9 percent of the dairy farms outside the district had silos.

The district's program has been an important factor in stimulating cooperators to carry on more scientific methods of farming. Better use of land resources has increased the farmers' interest in better management techniques. Increased forage supplies have developed more interest in scientific feeding. A primary goal is to provide herds a well-balanced dairy ration with a minimum of purchased feeds.

Herd-improvement work has gone hand in hand with efforts toward better feeding. Greater interest and activity in this work has been shown by the farmers in the district than in other parts of the county. Dairy-improvement work encompassed 22 percent of the herds in the district during 1948, as reported by the association tester, contrasted to 13 percent of the herds elsewhere in the county. One result of this work and of the more abundant for-

Mowing and loading flush-season grass for ensilage during late June on the T. G. Larson farm, South Tillamook Soil Conservation District. This pasture is grazed regularly throughout the season.

age has been an increased tendency to raise more of herd-replacement stock from proved producers, rather than to purchase cows from outside the county. All these things have contributed to greater and more efficient production.

Already, the progress achieved under the district's program is a definite mark of its profitableness. Since the original South Tillamook Soil Conservation District was created, the district has been enlarged five different times by petition of farmers who at the time were situated outside the boundaries. In 1948 the remaining agricultural lands of Tillamook County were voted into a newly formed North Tillamook Soil Conservation District. By the end of 1950, 85 farmers were cooperating with the new district. The farmers of Tillamook County have proof that conservation farming pays.

SLUG MENACE ENDED.—Snail-like slugs were causing a great deal of trouble at the Soil Conservation Service nursery at Tucson, Ariz. The slugs were crawling up the sides of the boxes and destroying plants that were being grown for windbreaks on irrigated farms in soil conservation districts in Arizona and New Mexico.

This is how the wire is placed around the top of the box.

Edward H. Morris, in charge of technical operations and propagation work at the nursery, and other employees, were staying up nights trying to curb the activities of the pesky slugs, but with little success.

Poisons which would kill other pests failed to affect the slugs. The mucous secretion spread by the slugs made them immune to the poison. Eventually, Morris picked up the idea of rigging up an electric wire that might kill the slugs and prevent them from damaging the nursery stock.

The device is simple. A wire is run around the top of the plant box and is hooked up to a power line with a converter for an electric fence being used as a safety precaution.

When the slug comes into contact with the electric wire, there's a sizzle and no more slug. The nursery employees now can spend their nights in peace, knowing that the slugs are not damaging the plants.

Morris and device for slugging slugs. The electric-fence converter makes the current safe for all except the intended victims.

NEW TEETH IN SOIL LAW.—Under a new law that became operative in Massachusetts on August 30, the penalty for removal of topsoil, loam, sand, and gravel from land not in public use is increased from a *maximum* of $20 for each offense, to a *minimum* of $50 for first offense, a *minimum* of $100 for second offense, and *not less than $200* for each subsequent offense. It is designed to halt the commercial traffic in topsoil from agricultural land. Difficulties in making the former enactment effective had been prevalent, particularly in Plymouth County. Contractors there successfully attacked a local bylaw, when the town of East Bridgewater sought to prevent them from moving 10,000 cubic yards of topsoil—more than 2,000 average truckloads—that had been stripped from farm land and piled there during the waiting period between passage of the original act and its effective date. The issue has been appealed by the town from the superior court to the supreme court.

THE RESPONSE OF PLANTS TO WATER

By PAUL B. SEARS

MAN cannot live without plant life, and as population presses more and more heavily on the land, vegetable material forms an ever larger proportion of the human diet. Fossil fuel from plants furnishes most of the energy for modern industry, while the growing demand for plastics, newsprints, oils, and building materials means constantly heavier drain upon plant products.

Even the most casual knowledge of history reveals how profoundly the course of civilizations and the forms of culture are influenced by plant life and the patterns of world vegetation. It is no accident that bread, wine, corn, and other fruits of the soil have a sacramental meaning for the world's great religious faiths. Yet by a curious inconsistency the science which deals with plant life is a Cinderella among the sciences taught in most schools and colleges, except those of forestry and agriculture.

The welfare of the plant kingdom is the welfare of man himself.

Among the requirements for plant growth none is more vital than moisture. Yet I suppose that most failures in the simple art of growing house plants are due to failure to recognize this fact. Certainly a major problem in the growing of crops is to have an adequate supply of moisture in proper balance at the proper time.

The older geographies divided the world very simply, by means of great circles, into temperature zones—cold at the poles and hot at the equator. No question about it, temperature is important to all forms of life. But when, little more than a century ago, men began to study the mosaic of forest, grassland, and desert which covers the face of the earth, the great circles which belted the maps proved almost useless. Plants had not been taught geography. In North America the belts of forest and grassland ran north and south, not east and west.

At first it was thought that rainfall might be the cause, and of course it is important. But as we learned to measure and map rainfall, that idea was exploded. Twenty inches of rainfall in Canada produces forest, in Mexico desert. We know now that evaporation, a process which the weather maps do not yet show, is fully as important as rainfall. Net profit is not determined by income, but by the relation of income to expense.

But evaporation is not the only source of expense in the water budget. Unless the soil is well supplied with organic matter, protected and held in place by a firm cover of vegetation, the loss of water through runoff is vastly increased. And it is fair to say that man's activities too seldom replace the natural vegetation with a cover which protects the soil and retards runoff.

Ohio and Iowa are conceded to be two of the greatest and best agricultural States in the Union. I have just traveled through both. I saw much of Ohio in company with three master farmers. We tried to estimate the proportion that is under the highest type of land use and management, and considered 10 percent to be a generous guess. One man said that in his own county, with some 2,000 farms, he knew of just one that would fill the bill. Incidentally, it was his judgment that production on the remaining 90 percent could be not merely doubled, but tripled by proper use and management. No small part of this increase would be due to a more favorable water budget, although many other factors are involved.

In Iowa we saw a similar situation, masked somewhat by the immense depth of topsoil and its great fertility. The type of agriculture there is largely extractive, with a minimum of grass-legume mixtures that approximate a natural cover. The problem here is largely one of intelligent water regulation—avoiding the danger either of too much or too little. I have been asked to speak in New Jersey next fall on the water problem, and when the local situation was explained to me I sent back the title, "Wet Cellars and Dry Bathtubs." The water problem is Nation-wide, and no respecter of rainfall maps. Much of the trouble is of our own making.

But my real assignment today is to report to you on a historical study we have been making for the past 2 years in our neighboring country of Mexico. This study, I believe, shows how sharply human activity can be limited by the availability of mois-

Note.—Dr. Sears is professor of conservation, Yale University, New Haven, Conn. This paper was presented at the most recent Conference on Conservation, Nutrition, and Health held under the auspices of Friends of the Land at Chicago.

ture. The purpose of telling it is to remind you that mankind is, after all, pitifully dependent upon nature. His hope, in spite of the false prophets, is not to conquer nature, but to follow her guidance and survive by complying with her uncompromising laws.

This idea is in danger from two sources. One source is highly respectable and scientific. Technologists, ignorant of biology but tremendously successful in solving problems of energy and mechanics, may feel that, no matter how deeply we become involved, they can work out an ingenious solution. The other source of danger lies in those who either know nothing of science or merely pay it lip-service. This group feels that man is an exception in the order of nature, and needs only cross his fingers and say "Kings-X" to get out of any jam. Promise such people the moon winningly enough and they fall in line as the rats of Hamelin town followed the Pied Piper. It is for their protection that we have to exercise some ethical control over advertising, quack doctors, and the like.

But back now to the beautiful Valley of Mexico, whose queen city was built on the bed of a lake, filled with hundreds of feet of sediment that had accumulated during the thousands of years. Just as the dusty floor of a cave, or even the waste heap of a city, contains the layered records of the past, the muds of this lake have their story to tell.

From the forest-clad mountains which surround the valley, clouds of yellow pollen have each year descended upon the waters of the ancient lakes, to be embalmed in its mud and preserved to the present time. This pollen comes chiefly from oak and pine, two kinds of trees which are in eternal competition for space. Moisture favors the spread of oak, while dryness throws the advantage of battle to the pine. Thus it happens, with an astonishing simplicity, that the records of long alternating periods of drought and moisture are preserved. We need only to drill down through the sediments and count the relative proportions of these two kinds of pollen to obtain the record at successive levels. This we have done back through the last interglacial period.

We have found that, throughout this long expanse of time, periods to be measured in centuries or millenia have been marked by deficient moisture. Separating them there have been prolonged times of fairly abundant moisture. These findings have been beautifully confirmed by our studies in northern New Mexico.

Some 4,000 years ago the Valley of Mexico was occupied by a clever and teeming population known to us as the Archaic culture. We have been able to connect our studies of fossil pollen with the pottery and figurines left by the Archaic people, and with old lake levels and rich black soil as well. All of the evidence agrees that their activity began and was carried on during a time of relatively abundant moisture.

But the end of the Archaic, uncovered by the recent drainage of Lake Texcoco, was at a time of low water level. Our studies show that the climate was then very dry. At this time there was a heavy fall of volcanic ash, affording a marker which has enabled us to extend our studies many miles in various directions. Everywhere the record is the same—the ash fall came during a very dry period which lasted for a long time thereafter. And during this dry time, from about 500 B. C. to about 800 A. D., there seems to be little trace of much human activity in the heart of the valley.

But gradually, as our records show, the climate became moist once more. The lakes, too, filled up. A great system of human activity, the Nahua, was once more established. Through its effective use of the lake margins in gardening, and the lake waters in fishing, it built up such vitality that by the time of the conquest, the Aztecs, a Nahua people, were overlords of much of Mexico. At the time of the conquest, the ancient city was surrounded by lakes and gardens, and there the Spaniards built their City of Mexico.

But this low-lying city was subject to floods. To get rid of floods, the conquerors began to drain the lakes which were the lifeblood of the economy. The process was not completed until about 1900. Two years ago, while working in the dry bed of Lake Chalco, I counted over twenty dust storms at one time. As the afternoon wore on these grew and merged until the air was filled with choking, impalpable dust—dust which had been fertile lake bottom until the beginning of the present century. And the village of Xico, which had been a prosperous garden center, trading by canoe with Mexico, was a pitiful and desiccated rural slum.

During the long dry period between 500 B. C. and 800 A. D. when, as I have mentioned, there was little activity in the heart of the valley, a great religious center was built on higher ground far to the north at Teotihuacan. This had commerce with moister lowlands across the mountains, eastward to-

ward the Gulf. But I surmise that it also had sources of underground water, now gone. The late Professor Vaillant thought that this community eventually perished because the hills above it were deforested for fuel. Professor Cook of California has shown that heavy soil erosion took place at the height of activity in Teotihuacan. The vast pyramids, abandoned, I believe, before the advent of the Nahua, remain for all to see. The larger has greater mass than the pyramid of Cheops in Egypt, and is almost as high.

The moist period which ushered in the Nahua civilization is evident in our own country and certainly extended into the nineteenth century. But since 1850 there has been a perceptible rise in temperature, which means, of course, less available moisture unless rainfall has increased, which it has not. Glaciers in our mountains and in Alaska, which had built up during the preceding centuries, have been receding since about 1850.

What this may mean in the decades to come I cannot say. But the pattern of the past is clear. Periods—long periods—of reduced moisture follow long periods of abundant moisture, and we may well be at the beginning of a long period of increased climatic hazard. Even if we are not, the experience of the past two decades, the insistent and growing thirst of our civilization is a matter we cannot ignore.

I have used our Mexican neighbors, for whom I have the greatest fondness and respect, as an example. But let us not forget how our own actions rendered the High Plains vulnerable to drought in the 1930's. Nor let us forget that the same type of speculative, extractive land use which ushered in that disaster is once more under way.

HOW BANKERS MAY HELP

By LOUIS P. MERRILL

RECENTLY we were asked, "What can bankers do to help soil conservation districts?" This question came from J. C. Porter, who was once a district conservationist with the SCS, and now is director of the agricultural department of the First National Bank of Wichita Falls, Tex. One of Porter's jobs is to help correspondent banks with their agricultural programs.

Out of Porter's simple inquiry came a number of pointed suggestions, among them the following:

1. Become thoroughly acquainted with the soil conservation district set-up so that there can be no confusion or lack of understanding in the minds of all bank employees as to what a district is, what it is supposed to do, how it operates, and how it differs from all other agencies, organizations, and groups that are working full time or part time on the conservation of our soil and water resources. Until this is fully understood, no effort to help in the district's program can be completely effective.

2. Acquaint the bank's clients and prospective clients owning or operating farm land with the need for soil conservation, the benefits of a coordinated conservation program, and ways to obtain help in planning and applying such a program through the soil conservation district.

3. Know the supervisors of the district, where they live, when and where they meet, so that an inquirer or client may be referred to a local supervisor or to the board as a whole.

4. Encourage clients who are district cooperators or prospective cooperators to get acquainted with all the supervisors and to help them carry out the district program, showing them that their active participation is needed.

5. Be acquainted with district activities so that you can talk convincingly with farmers and ranchers who may be interested in adopting soil conservation programs. Knowing the increase in crop yields, and other specific benefits from conservation farming or ranching, is one of the best means of getting others interested. Talk about *profits* in conservation.

6. Know exactly what help a cooperator or ACP participant can obtain from the Soil Conservation Service, the PMA, and other agencies, so that the prospect will not be led to expect more than can be delivered, or be discouraged by being told he will get less help than is available.

7. Encourage district cooperators and prospective cooperators to work together in neighbor groups, as an effective means of getting more conservation work done with their pooled resources.

8. Organize a committee representing all banks in the soil conservation district to work with dis-

---

Note.—The author is regional director, Soil Conservation Service, Fort Worth, Tex.

trict supervisors, meeting jointly at regular times.

9. Encourage newspapers, radio stations, and businessmen to organize in similar fashion, all to meet with district supervisors on conservation matters of mutual concern.

10. Participate actively in field tours, using bank displays and other means of advertising the event.

11. Plan to include soil conservation in regular newspaper advertising, timing each advertisement to the season.

12. Award cash prizes annually for the best essays on soil conservation in grade and junior and senior high schools of the district.

13. Sponsor an annual get-together dinner with supervisors, newspaper editors, radio-station managers, businessmen, and others. Present cash awards or savings bonds to the best conservation farmer and group in each zone of the district.

14. Finance by secured loans the purchase of seed, trees, fertilizers, and equipment, especially when the lack of such items is holding up conservation.

15. Show continuing interest in your client's progress toward becoming a conservation farmer or rancher. Make an occasional visit to your client's farm or ranch, so that you can discuss his conservation program on even terms.

16. Explain to applicants for farm loans why your bank will lend more money on a conservation farm than on a nonconservation farm. One banker, W. T. Andrews, vice president of the Spur Security Bank, Spur, Tex., says: "On the average 160-acre farm in our trade territory, we could make a loan of around $100 to $200 before the district started conservation work several years ago. Today we can loan this man from $500 to $600 if he has a good conservation program, and feel just as secure."

17. Explain to clients in the business and professional field the value of the district's program to them and to the whole community. As Andrews observed: "Soil conservation has, in my opinion, increased our production in the Spur trade territory one-third, and it has made credit more secure for our bank."

18. Initiate bank displays of conservation pictures and other material. This should be done by bank personnel so that they will become familiar with soil conservation and recognize their part in it.

19. Print copies of "how to do it" conservation job sheets, with photos, to illustrate soil conservation practices.

20. Finance the printing and distribution of a promotional folder for the district, making it attractive in appearance and easy to read.

21. Read the annual report of the district and discuss it at a meeting of all bank employees.

22 In regular contacts with district supervisors, find out what important soil conservation practices are lagging and then plan a campaign to popularize these practices.

23. Promote any special activity that will advance the soil conservation program, increase the general income and welfare of the community, and center attention on the district program. For example: In an Arkansas community, a cheese plant was an important factor in the economy, but the plant ran full time only in the summer because milk production lessened in fall and winter. The bank met with district supervisors, chamber of commerce representatives, and SCS technicians. They worked out a plan of small bank loans for pasture improvement, to achieve year-round grazing. Chamber of commerce members endorsed the loans. There was no defaulting. Other farmers, seeing what was going on, financed their own pasture improvements. Now the cheese plant runs full time the year around. The farmers are better off, the workers in town are better off, the bank is better off, and the businessmen are better off.

24. Emphasize the profit and importance of large yields on suitable land over small yields on larger acreage that might involve endangering the soil through improper use.

25. Learn, proclaim, and explain, at every opportunity, the fundamental principles of soil conservation: Use the land within its capabilities, and treat it according to its needs. Once that principle is understood and followed, the conservation of our soil and water resources is assured.

GOT YOUR FARM PLAN HANDY?—A practical answer to the question of how well farmers keep up with their farm plans was provided in Noxubee County (Miss.) Soil Conservation District when fire destroyed the 238 copies of plans in the work unit office. R. M. Currie, work unit conservationist, hustled around and picked up 184, or 77 percent of the plans, from farmers themselves. Thirty-nine were replanned from land-use maps, and 15 were canceled because of change in ownership.

RAISING PRODUCTION ON AN ARIZONA FARM

By WILLIAM G. WILLIAMS

FRANK WILLIAMS changed the channel of the Santa Cruz River to keep stream-bank erosion from destroying his valuable farm land. He also used conservation practices to restore abandoned or severely eroded fields to profitable production. Williams cultivates 200 acres in separate tracts near the base of "A" Mountain on the southwest edge of Tucson, Ariz.

Some of Williams' calves on alfalfa pasture.

He came to Arizona in 1930. Today, Williams operates the "A" Mountain Dairy and sells at wholesale the milk from 125 cows. In addition, there are 30 heifers and calves. There are alfalfa, barley, hegari, Sudangrass, and bur-clover for the livestock. The manure goes to improve soil fertility. In "spare time" Williams operates a very modern grocery store and filling station.

In the last 20 years, Williams has bought, improved, and sold several tracts. He is constantly on the lookout for means of improving the productivity of his land. In May 1946 he signed with the Pima County Soil Conservation District and since then has had the help of SCS technicians.

One of the first jobs Williams tackled was stream-bank erosion. With each heavy flow the meandering Santa Cruz River was stealing some of his best soil. Already, the stream had cut about 50 feet into one field for a considerable distance. Williams knew it would be difficult and expensive to halt this process single-handed.

Note.—The author is soil conservationist, Soil Conservation Service, Tucson, Ariz.

The riverbanks along this area revealed heavy deposits of gravel and sand, and there were good markets for both. Williams did the logical thing. He contacted a construction concern and agreed to sell it the gravel and sand. The company made the first removals from a 1,450-foot strip that would provide a new channel for the river. This was done and the Santa Cruz now has been flowing beside Williams' field for more than 2 years without causing any further damage.

"It's like eating your cake and having it, too," says Williams. "The sale of the gravel and sand not only provided a new channel for the river, but afforded a profit also, and I'm still selling gravel.

Williams takes pride in guiding visitors over his several pastures and explaining just what has been done to get each up to its present high productivity. One of his pastures was once operated as a vegetable farm by a Japanese farmer. It became severely eroded and was cut by numerous deep gullies. Almost everyone except Williams considered the land worn out and didn't believe it ever could be made productive again. Williams filled the gullies, leveled and fertilized the field, and put in a new irrigation system. Today, this is one of the most productive of his several pastures.

Still another pasture—this one of 13 acres—has been built from wasteland. It had been abandoned.

Fish pond stocked with bass, bluegills, and catfish.

Frank Williams testing flow of irrigation water on his farm near Tucson.

First, Williams cut the trees that had grown up on this undulating tract. The land was so uneven that it had to be leveled in benches, and even this necessitated cuts and plenty of fertilizer. This former wasteland now provides an excellent alfalfa pasture.

This is where Williams plans to build his new home soon.

One tract of 4 acres is located where it was necessary to build a siphon under the river in order to get irrigation water to the land. The tract was heavily infested with mesquite, which had to be cleared. Mesquite usually is piled and burned when land is being cleared, but Williams had a better idea. He had it cut up for wood which he sold for enough to pay the cost of leveling. This formerly "worthless" land now carries a fine stand of alfalfa.

Williams has a 7-acre pasture near his present home where he is trying out sprinkler irrigation. This is about the only spot of his 200 acres that hasn't been finished-leveled, and he believes this may not be necessary since the grain is doing well and the field is easy to irrigate.

Also included in Williams' holdings are some of the old and abandoned wells which once served the Flowing Wells Irrigation District. Today, the tops of the old wells protrude from a narrow oblong pond which has been stocked with bass, bluegills, and catfish.

Wells provide irrigation water for all of Williams' land. In carrying out his soil and water conservation program, he has leveled practically all of his land, concrete head gates have been installed, irrigation ditches have been realigned for more efficient use of water, fertilizer is being applied continually, and rotated grazing is practiced. He also plans to line some of his irrigation ditches with concrete or to install concrete pipes to carry the water.

"The use of conservation practices has enabled me to get poor land into profitable production, has doubled yields on the better land, and provides a big saving in water, time, and labor," Williams declares.

DON'T BEAT YOUR SOIL TO DEATH.—Too much tillage is harmful to arid soil in Arizona. Karl Harris, SCS irrigation engineer at Phoenix, recently reported the results of some tillage tests on the University of Arizona experimental farm at Safford. For some time it has been noted that disking, floating, and other tillage operations used to prepare a seedbed decrease the intake rate of water that enters the ground and consequently make it more difficult to get a deep penetration of moisture. It has also been noted that crops do not grow so rapidly or yield so much in areas in front of gates or in turn rows where farm machinery has been over the ground many times.

In an effort to determine the effect of tillage on the yield of barley, a test was made on the Safford experimental farm. It was planned to prepare rough tillage with the conventional method of seedbed preparation. Also included was a comparison of the effect on the yield of barley of two qualities of water.

Sixteen plots were used. Half of them were irrigated with water from the well on the university farm, which contained 4,017 parts per million of total soluble salts. The others were irrigated with water from the Gila River, which is very low in soluble salts. The experiment was modified slightly in the spring of 1951, due to the fact that no water was available in the river for irrigation, and it was necessary that the last two irrigations on all plots be made from well water containing salt.

The plots were laid out so that two adjacent plots were rough-tilled, the next two plots conventionally tilled, and so on. Of the eight plots left rough, four were irrigated with river water and four with salt

water, and the same method of irrigation was given the conventionally tilled plots.

The only work done on the rough-tilled plots was to plow the land several months before planting. The seed was broadcast on this rough-plowed land and irrigated up. The plots using the conventional-tillage method were plowed several months before the barley was planted, then disked and harrowed before it was pre-irrigated. After irrigation, the land was again disked and harrowed, and planted. Other than preparation of seedbed, both treatments were exactly the same; that is, they were planted at the same time and irrigated at the same time.

From the time the barley started to grow, it was apparent that the plants on the rough-tilled plots were much healthier and of a darker green than those on the conventionally tilled plots. Where the salty well water was used, the rough-tilled plots produced two and one-half times more barley than the conventionally tilled plots. Where river water was used, the difference in yield was not nearly so great; however, there was a decided increase in yield of the rough tillage over the conventional method. A very important result of this test was the fact that the yield on the rough-tilled plots using the salty well water was about the same as that of the conventionally tilled plots using the river water.

The conventional method of tillage costs approximately $8 more per acre than rough tillage. If $8 per acre were saved on all the land planted to grain in Arizona, it would result in a tremendous saving. And if the saving in seedbed preparation were added to the returns from the increased yield under rough tillage, this one crop alone would pay many times the cost of all of the research in the State of Arizona.

When handling the arid soils of Arizona, keep tillage operations at a minimum.

—GEORGE D. CLYDE

SOIL CONSERVATION

"Some of the towns in this area, backed by law, restrict the sale and removal of topsoil from farm lands from which the towns derive taxes.

"Allen Benjamin of the State planning board will explain the laws, also the significance of the laws to future generations, at a meeting of the Plymouth County Soil Conservation District on Friday at A. R. Parker's, East Bridgewater.

"Test cases have been heard in Brockton district court. Brockton's alert and competent farm bureau agent, Mr. Brown, has gone on the air over WBET to give the public information about the laws.

"The issue isn't whether a man has a right to sell his own property. Be it said he owns a farm. It took hundreds of years and the chemistry of nature to create the fertility which makes topsoil productive.

"Has he a right to impoverish the land, the community, and future generations by depriving them of a natural resource-not of man's making?

"No one has a right to impair or destroy natural and real wealth. Though despoliation has been practiced—standing timber, one instance—it has been wrong.

"A community has a right to protect what belongs to the future as well as to the present—topsoil."

—From the *Brockton* (Mass.) *Enterprise.*

HALF MILLION FOR EQUIPMENT.—The Division of Soil and Water Resources of the Kentucky Department of Conservation has spent $500,000 from its revolving fund for soil conservation equipment. The division was created in 1946 to assist districts. The equipment is being amortized as it is used to get soil and water conservation practices applied.

NOTES FROM THE DISTRICTS

HELPING HANDS.—When ex-Marine Frank Flees, Marathon County (Wis.) Soil Conservation District, lost an eye while filling a silo, his friends dedicated a "Good Neighbor Day" to help him. About 200 farmers and friends worked on 25 projects, which included building a house and barn, preparing 25 acres for alfalfa, renovating 10 acres of pasture, digging a pond, clearing stones, and planting trees.

BETTER THAN TAXES.—The towns of Buckfield and Canton, in the Oxford County (Maine) Soil Conservation District have entered into agreements with the district through which tax-delinquent lands will be converted into town forests—revenue producers. Eventually, it is expected that these towns will receive a much larger income from this land than they would have received in taxes if the land had remained in private hands. Work in Canton will start in 84 acres of mostly open fields where 2 to 3 acres of seedlings will be planted annually.

U. S. GOVERNMENT PRINTING OFFICE: 1951

TREES AGAINST THE WIND.—Farmers in the Sherburne County (Minn.) Soil Conservation District speeded up windbreak planting to keep their sandy soil from blowing away. About 2,400 cuttings from an SCS experimental shelterbelt were plowed in as the first start on a cutting nursery. Varieties included European poplar and two bush types of Ural willows. Recent inspection showed nearly a 100-percent survival.

DEC 7- 1951
Public Library
Detroit, Mich.
General Information

KNEW CONSERVATION WHEN HE SAW IT.—One morning in mid-August this summer, a large bus pulled into the Coshocton, Ohio, Soil Conservation Service experiment station. As the passengers began alighting, I hurriedly looked over my calendar. No tour scheduled! The bus driver, who seemed to know exactly what he was about, came directly to my office.

"I have brought you some visitors from Fairfield County Farm Bureau Council No. 11," he said. "Each year the families of this council schedule a bus for an all-day tour. They select two or three points to visit and leave the rest to the driver. I have been over here three times with chartered tours of Ohio State University students and I told these Fairfield County folks that you had something very interesting to show them."

I replied that it would be a pleasure and an opportunity to receive his group. So, during the next 45 minutes in the meeting hall and 45 minutes in the field, these folks were given information on the magnitude of soil erosion and water loss, the effect of conservation farming, and the principles of soils, water, and land management.

When the visitors left, many of them said they would like to return some other time for a longer stay. I thanked the bus driver, Paul Hickey of Columbus, and asked him to bring other groups whenever circumstances permitted.

—LLOYD HARROLD

AWARD FOR TOP TEXAN.—Beginning in 1952, an annual award is to be presented to the outstanding soil conservation district supervisor in Texas, it is announced by the Texas Bank and Trust Co. of Dallas. This award is to be an all-expense trip for the supervisor and his wife to some chosen area within the United States or its possessions to study soil and water conservation methods.

The winner will be selected through a banker-farmer-rancher tie-up in each district. Each of the 165 districts in Texas has 5 supervisors, all farmers and ranchers. Banks will be asked to nominate the outstanding supervisors in their districts. These nominations will go to zone committees, which will screen the nominations and send one name from each zone to a State Conservation Award Committee, which will select the winner. The State committee will include Claude Jones, Gainesville banker; Paul Walser of Temple, State soil conservationist; Clayton Puckett of Fort Stockton, head of the Texas Association of Soil Conservation District Supervisors; Walter Humphrey, editor of the Fort Worth Press; C. M. Caraway of De Leon, chairman of the State Soil Conservation Board; and P. B. (Jack) Garrett, president of the Texas Bank & Trust Co. of Dallas.

This program is designed to create a better understanding and closer relationship between banker, farmer, and rancher, as farming and ranching are the basis of the Texas economy.

Winning of the award will bring recognition not only to the supervisor but to the district and zone he represents.

ARMY LAND LEASED.—When the Corps of Engineers decided to return more than 10,000 acres of the Redstone Arsenal near Huntsville, Ala., to agricultural production, they called in the Soil Conservation Service and the supervisors of the Northeast Alabama Soil Conservation District.

Thus far, 6,727 acres have been leased for 4½ years to 12 farmers with provisions that use be kept within capabilities and that conservation treatment be given according to needs.

About 3,000 acres will be seeded to tall fescue, and the rest will be put in clovers, small grain, or hay.

NATIONAL CHAMPS HONORED.—Two brothers, Larry and Grady Torrence, of Baldwin County, Ga., winners of National 4-H Championships in Soil Conservation, were honored at a special program arranged by supervisors of the Piedmont Soil Conservation District. Larry and Grady are sons of Mr. and Mrs. C. W. Torrence, who were among the first farmers in Baldwin County to sign a district cooperative agreement after the Piedmont district was organized in 1939. Larry, who won the 4-H championship several years ago, has since graduated from the University of Georgia with honors and is now serving as a lieutenant in the Army. He was unable to be present for the ceremonies, so the supervisors presented his award, a framed certificate, to his mother and father. Grady won the 4-H Championship in Soil Conservation in 1950. He has completed 128 4-H Club projects and is now Master 4-H Club boy. He entered the University of Georgia this fall.

Public Library
Detroit, Mich.
General Information